

CLAIMS

What is claimed is:

1. A method of making plastic articles with embossed pattern, comprising the steps of:

injection molding plastic material in a cavity of a clamping unit of an injection molding machine to form an injection-molded plastic article; and

embossing a pattern from a foil strip onto a previously injection-molded plastic article to form a finished plastic product with embossed pattern, whereby the embossing step is decoupled from the injection molding step and carried out separately from a clamping step of the clamping unit.
2. The method of claim 1, wherein the embossing step and the injection molding step are carried out simultaneously.
3. The method of claim 1, wherein the embossing step and the injection molding step are carried out upon a rotary table disposed between a fixed mold mounting plate and a moving mold mounting plate.
4. The method of claim 1, and further comprising the step of ejecting the finished plastic product, wherein the embossing step and the ejecting step are carried out in a common station at a same time as the injection molding step.

5. The method of claim 1, and further comprising inserting cores into molds of the injection machine at a same time as the injection molding step in a same station as the embossing step.
6. The method of claim 1, wherein the embossing step includes hot stamping.
7. The method of claim 1, wherein the pattern is an electric conductor path structure.
8. The method of claim 1, wherein the pattern is a design structure.

9. An injection molding machine for making plastic articles with embossed pattern, comprising:

an injection-molding unit;

a clamping unit having a fixed mold mounting plate and a moving mold mounting plate;

at least one injection molding station having an injection mold which includes a fixed mold half attached to the fixed mounting plate, and a moving mold half attached to the moving mounting plate;

at least one embossing station disposed between the fixed and moving mounting plates, wherein the embossing station includes a stamping plunger, movable between the mounting plates and having attached thereon stamping tools, and a reservoir of a foil strip; and

transfer means for interaction with the injection molding and embossing stations.

10. The injection molding machine of claim 9, wherein the transfer means includes a rotary table.

11. The injection molding machine of claim 10, wherein the turntable is secured to the fixed mounting plate, wherein the turntable has recesses of a number equaling a number of injection-molding and embossing steps, wherein the fixed mounting plate has recesses in an area of the injection molding positions, and wherein the stamping plunger is operatively connected to the moving mounting plate.
12. The injection molding machine of claim 10, wherein the rotary table is secured to the moving mounting plate, and wherein the stamping plunger is operatively connected to the fixed mounting plate.
13. The injection molding machine of claim 9, wherein one or more injection units are movable from one side into a space between the mounting plates, wherein the stamping plunger is operatively connected to one of the fixed mold half and moving mold half.
14. The injection molding machine of claim 9, wherein the stamping plunger is operatively connected to one of the mounting plates, wherein said one mounting plate has a bore for passage of the stamping plunger.

15. The injection molding machine of claim 9, and further comprising an auxiliary element, provided on one of the fixed mounting plate and moving mounting plate, for supporting the attached half of the injection mold, wherein the stamping plunger is movably guided in the auxiliary element.
16. The injection molding machine of claim 15, wherein the auxiliary element has a guide bushing for movably guiding the stamping plunger.
17. The injection molding machine of claim 15, wherein the auxiliary element has in clamping direction a length in an area of the stamping plunger which length is equal to the sum of a length of the one of the fixed and moving mounting plates in clamping direction and a length of the auxiliary element in this area.
18. The injection molding machine of claim 9, wherein the fixed mounting plate has a central injection area and a sprue bushing with deflection channel.
19. The injection molding machine of claim 9, including a single said injection station and a single said embossing station, wherein the moving mold half is made of two identical tools.
20. The injection molding machine of claim 9, and further comprising a roll-off device, attached to the stamping plunger, for supply of the foil strip.

21. The injection molding machine of claim 20, wherein the roll-off device is secured to a fixed position.
22. A clamping unit for an injection molding machine, comprising:
an injection molding station; and
an embossing station, disposed side-by-side to the injection station, for pressing a pattern onto another plastic article previously injection-molded in the injection molding station,
wherein the injection molding station and the embossing station share a common tool which forms part of a mold half in the injection molding station and at a same time a holder for the injection-molded plastic article in the embossing station; and
transfer means for operating the common tool between the injection molding and embossing stations.
23. The clamping unit of claim 22, wherein the transfer means is a rotary table.
24. The clamping unit of claim 22, and further comprising a retainer block in confronting disposition to the common tool, wherein the embossing station includes a stamping plunger received in the retainer block and movable in a direction of the common tool for pressing a foil strip against the previously injection molded plastic article to emboss the pattern.

25. The clamping unit of claim 24, wherein the injection molding station includes a sprue bushing and a hot runner received in the retainer block for feeding plastic material to a cavity delineated by the tool and another mold half of the injection molding station.
26. The clamping unit of claim 24, and further comprising a roll-off device, attached to the stamping plunger, for supply of the foil strip.